**CLAIMS:**

1. A method comprising:

rendering a digital representation of a dental arch within a three-dimensional (3D) environment; and

displaying a planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the dental arch.

2. The method of claim 1, wherein displaying a planar guide comprises displaying the planar guide proximate a tooth of the dental arch to aid the practitioner in placement of the orthodontic appliance on the tooth.

3. The method of claim 2, wherein displaying a planar guide further comprises generating the planar guide within the 3D environment relative to a coordinate system associated with the orthodontic appliance.

4. The method of claim 2, wherein displaying a planar guide further comprises automatically adjusting a location and an orientation of the planar guide within the 3D environment as the practitioner adjusts the orthodontic appliance with respect to the tooth.

5. The method of claim 1, wherein the planar guide comprises a mesial planar guide, and displaying a planar guide further comprises rendering the mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance.

6. The method of claim 5, wherein rendering a mesial planar guide and a distal planar guide further comprises rendering the mesial planar guide and the distal planar guide parallel to and equidistant from the midsagittal plane of the orthodontic appliance.

7. The method of claim 1, wherein the planar guide comprises an occlusal planar guide, and displaying a planar guide further comprises rendering the occlusal planar guide parallel to a midlateral plane of the orthodontic appliance and proximate an occlusal surface of a tooth of the dental arch.

8. The method of claim 1, wherein the planar guide comprises a midlateral planar guide, and displaying a planar guide further comprises rendering the midlateral planar guide parallel to a midlateral plane of the orthodontic appliance.

9. The method of claim 1, wherein the planar guide comprises a midfrontal planar guide, and displaying a planar guide further comprises rendering the midfrontal planar guide parallel to a midfrontal plane of the orthodontic appliance.

10. The method of claim 1, wherein the planar guide comprises a midsagittal planar guide, and displaying a planar guide further comprises rendering the midsagittal planar guide parallel to a midsagittal plane of the orthodontic appliance.

11. The method of claim 1, wherein the planar guide comprises a gingival planar guide, and displaying a planar guide further comprises rendering the gingival planar guide parallel to a midlateral plane of the orthodontic appliance and proximate a gingival edge of a tooth of the dental arch.

12. The method of claim 1, wherein displaying a planar guide further comprises displaying the planar guide as a semi-transparent two-dimensional plane within the 3D environment.

13. The method of claim 1, wherein displaying a planar guide further comprises displaying the planar guide as a partial plane comprising at least two lines within the 3D environment.

14. The method of claim 1, further comprising:

displaying the planar guide as a first planar guide having a first color; and

displaying a second planar guide within the 3D environment with a second color different from the first color.

15. The method of claim 14, further comprising adjusting the first color and the second color in response to input from the practitioner.

16. The method of claim 1, further comprising adjusting a transparency of the planar guide based on input from the practitioner.

17. The method of claim 1, further comprising displaying the planar guide as opaque or invisible based on input from the practitioner.

18. The method of claim 1, further comprising:

storing data that describes attributes for types of orthodontic appliances that may be selected by the practitioner, and

controlling the display of the planar guide based on the stored attributes for the types of orthodontic appliances.

19. The method of claim 18, wherein storing data that describes attributes for types of orthodontic appliances comprises storing one or more of dimensions, slot locations, torque angles, and angulations for the types of orthodontic appliances.

20. The method of claim 1, further comprising:

storing planar guide data that specifies types of planar guides;

receiving input from the practitioner enabling the display of at least one or more the types of planar guides; and

displaying the planar guide in accordance with the selected one or more types of planar guides.

21. The method of claim 1, further comprising:

storing planar guide data that describes attributes for different types of planar guides, and

displaying the planar guide in accordance with the stored attributes for the different types of planar guides.

22. The method of claim 21, wherein storing planar guide data comprises storing attributes for the different types of planar guides with respect to different types of orthodontic appliances.

23. The method of claim 21, wherein storing planar guide data comprises storing attributes for the different types of planar guides with respect to different types of teeth within the dental arch.

24. The method of claim 21, wherein storing planar guide data comprises storing attributes that specify distances for each of the different types of planar guides with respect to at least one of a tooth of the dental arch, a different one of the planar guides, and the orthodontic appliance.

25. The method of claim 21, wherein storing planar guide data comprises storing attributes that specify shear angles and scales for the different types of planar guides.

26. The method of claim 1, further comprising automatically scaling the planar guide within the 3D environment to size the planar guide based on one or more dimensions of a tooth within the dental arch.

27. The method of claim 1, further comprising automatically shearing the planar guide in accordance with a shear factor that is based on an angulation associated with the orthodontic appliance.

28. The method of claim 27, wherein automatically shearing the planar guide comprises automatically shearing the planar guide in accordance with an angle of the orthodontic appliance relative to an occlusal-gingival axis of the orthodontic appliance.

29. The method of claim 1, further comprising:

storing data defining one or more rules for placing the orthodontic appliance; and

controlling the planar guide to assist the practitioner in positioning the orthodontic appliance in accordance with the placement rules.

30. The method of claim 29, further comprising automatically rendering the planar guide within the 3D environment as parallel to a midsagittal plane of the orthodontic appliance in response to one of the placement rules that requires a longitudinal or occlusal-gingival axis of the orthodontic appliance be aligned with the midsagittal plane of the tooth.

31. The method of claim 1, further comprising:

storing statistical normal distances for one or more dimensions of teeth; and

rendering the planar guide at a location within the 3D environment based on the statistical normal distances.

32. The method of claim 31, further comprising:

receiving input biasing the planar guide relative to the statistical normal distance; and

adjusting the location for the planar guide based on the input.

33. The method of claim 1, further comprising displaying visual reference markers relative to the planar guide at discrete intervals.

34. The method of claim 33, wherein displaying visual reference markers comprises displaying a rectilinear grid of semi-transparent lines on the planar guide.

35. The method of claim 33, wherein displaying visual reference markers comprises displaying points, crosshairs, tic marks, discs, squares, or spheres at the discrete intervals.

36. The method of claim 33, wherein displaying visual reference markers comprises displaying the visual reference markers throughout a volume bounded by the planar guide and at least one other planar guide.

37. The method of claim 1, further comprising displaying contour lines on the planar guide, wherein each contour line indicates a constant distance to an object within the 3D environment relative to the planar guide.

38. The method of claim 1, wherein the orthodontic appliance comprises an orthodontic bracket, a buccal tube, a sheath, a button or an arch wire.

39. A system comprising:

a computing device; and

modeling software executing on the computing device, wherein the modeling software comprises:

a rendering engine that renders a digital representation of a dental arch within a three-dimensional (3D) environment, and

a user interface that displays a planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the dental arch.

40. The system of claim 39, wherein the modeling software further comprises a guide control module that controls a location of the planar guide within the 3D environment.

41. The system of claim 40, wherein the guide control module locates the planar guide proximate a tooth of the dental arch within the 3D environment to aid the practitioner in placement of the orthodontic appliance on the tooth.

42. The system of claim 40, wherein the guide control module generates the planar guide within the 3D environment based on a coordinate system associated with the orthodontic appliance.

43. The system of claim 40, wherein the guide control module automatically adjusts a location and an orientation of the planar guide within the 3D environment as the practitioner adjusts the orthodontic appliance with respect to the tooth.

44. The system of claim 40, wherein the planar guide comprises a mesial planar guide, and the guide control module generates the mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance.

45. The system of claim 44, wherein the guide control module generates the mesial planar guide and the distal planar guide parallel to and equidistant from the midsagittal plane of the orthodontic appliance.

46. The system of claim 40, wherein the planar guide comprises an occlusal planar guide, and the guide control module locates the occlusal planar guide within the 3D environment parallel to a midlateral plane of the orthodontic appliance and proximate an occlusal surface of the tooth.

47. The system of claim 40, wherein the planar guide comprises a midlateral planar guide, and the guide control module locates the midlateral planar guide parallel to a midlateral plane of the appliance.

48. The system of claim 40, wherein the planar guide comprises a midfrontal planar guide, and the guide control module generates the midfrontal planar guide parallel to a midfrontal plane of the orthodontic appliance within the 3D environment.

49. The system of claim 40, wherein the planar guide comprises a midsagittal planar guide, and the guide control module generates the midsagittal planar guide parallel to a midsagittal plane of the orthodontic appliance.

50. The system of claim 40, wherein the planar guide comprises a gingival planar guide, and displaying a planar guide further comprises rendering the gingival planar guide parallel to a midlateral plane of the orthodontic appliance and proximate a gingival edge of the tooth.

51. The system of claim 39, wherein the user interface displays the planar guide as a semi-transparent two-dimensional plane within the 3D environment.

52. The system of claim 39, wherein the user interface displays the planar guide as a partial plane comprising at least two lines.

53. The system of claim 40, further comprising:

a database to store data that describes attributes for types of orthodontic appliances that may be selected by the practitioner, and

wherein the guide control module controls the location of the planar guide based on the stored attributes.

54. The system of claim 53, wherein the database is located remote from the computing device and coupled to the computing device via a network.

55. The system of claim 53, wherein the attributes comprise one or more of dimensions, slot locations, torque angles, and angulations for the types of orthodontic appliances.

56. The system of claim 40, further comprising:

a database that stores planar guide data that specifies types of planar guides,

wherein the user interface receives input from the practitioner enabling the display of at least one or more of the types of planar guides, and the guide control module controls the planar guide within the 3D environment in accordance with the selected one or more types of planar guides.

57. The system of claim 40, further comprising:

a database that stores planar guide data that describes attributes for different types of planar guides, and

wherein the guide control module controls the planar guide within the 3D environment in accordance with the stored attributes for the different types of planar guides.

58. The system of claim 57, wherein the database stores attributes for the different types of planar guides with respect to different types of orthodontic appliances.

59. The system of claim 57, wherein the database stores attributes for the different types of planar guides with respect to different types of teeth within the dental arch.

60. The system of claim 57, wherein the database stores attributes that specify distances for each of the different types of planar guides with respect to at least one of a tooth of the dental arch, a different one of the planar guides, and the orthodontic appliance.

61. The system of claim 57, wherein the database stores attributes that specify shear angles and scales for the different types of planar guides.

62. The system of claim 40, wherein the guide control module automatically scales the planar guide within the 3D environment to size the planar guide based on one or more dimensions of a tooth within the dental arch.

63. The system of claim 40, wherein the guide control module automatically shears the planar guide in accordance with a shear factor that is based on an angulation associated with the orthodontic appliance.

64. The system of claim 40, wherein the guide control module automatically shears the planar guide in accordance with an angle of the orthodontic appliance relative to an occlusal-gingival axis of the orthodontic appliance.

65. The system of claim 40, further comprising

a database that stores data defining one or more rules for placing the orthodontic appliance, and

wherein the guide control module controls the planar guide within the 3D environment in accordance with the placement rules.

66. The system of claim 65, wherein the guide control module automatically renders the planar guide within the 3D environment as parallel to a midsagittal plane of the orthodontic appliance in response to one of the placement rules that requires a longitudinal axis or an occlusal-gingival axis of the orthodontic appliance be aligned with the midsagittal plane of the tooth.

67. The system of claim 40, further comprising:

a database that stores statistical normal distances for one or more dimensions of teeth, and

wherein the guide control module controls the location of the planar guide within the 3D environment based on the statistical normal distances.

68. The system of claim 40, wherein the user interface receives input biasing the planar guide relative to the statistical normal distance, and the guide control module adjusts the location for the planar guide based on the input.

69. The system of claim 39, wherein the user interface displays visual reference markers relative to the planar guide at discrete intervals.

70. The system of claim 69, wherein the user interface displays the visual reference markers as a rectilinear grid of semi-transparent lines on the planar guide.

71. The system of claim 69, wherein the user interface displays the visual reference markers as points, crosshairs, tic marks, discs, squares, or spheres at the discrete intervals.

72. The system of claim 69, wherein the user interface displays the visual reference markers throughout a volume bounded by the planar guide and at least one other planar guide.

73. The system of claim 39, wherein the user interface displays contour lines on the planar guide, wherein each contour line indicates a constant distance to an object within the 3D environment relative to the planar guide.

74. The system of claim 39, wherein the orthodontic appliance comprises an orthodontic bracket, a buccal tube, a sheath, a button or an arch wire.

75. A computer-readable medium comprising instructions for causing a programmable processor to:

render a digital representation of a tooth within a three-dimensional (3D) environment; and

display a planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the tooth.

76. The computer-readable medium of claim 75, wherein the instructions cause the processor to:

associate a coordinate system with the orthodontic appliance within the 3D environment, and

generate the planar guide within the 3D environment relative to the coordinate system associated with the orthodontic appliance.

77. The computer-readable medium of claim 75, wherein the instructions cause the processor to automatically adjust a location and an orientation of the planar guide within the 3D environment as the practitioner adjusts the orthodontic appliance with respect to the tooth.

78. The computer-readable medium of claim 75, wherein the instructions cause the processor to display the planar guide as one of:

a mesial planar guide or a distal planar guide parallel to and optionally equidistant from a midsagittal plane of the orthodontic appliance,

an occlusal planar guide parallel to a midlateral plane of the orthodontic appliance and proximate an occlusal surface of the tooth,

a gingival planar guide parallel to a gingival edge of the orthodontic appliance,

a midlateral planar guide parallel to a midlateral plane of the orthodontic appliance,

a midfrontal planar guide parallel to a midfrontal plane of the orthodontic appliance, and

a midsagittal planar guide parallel to a midsagittal plane of the orthodontic appliance.

79. The computer-readable medium of claim 75, wherein the instructions cause the processor to:

store data defining one or more rules for placing the orthodontic appliance; and

control the planar guide to assist the practitioner in positioning the orthodontic appliance in accordance with the placement rules.